CLAIMS

What is claimed is:

1. An optical pickup device comprising:

a light source to emit light;

an objective lens to focus the emitted light from the light source on a recording medium to form a light spot;

an optical path changer disposed on an optical path of the emitted light between the light source and the objective lens, the optical path changer changing the optical path of the emitted light;

a chromatic aberration correction lens disposed on the optical path between the light source and the objective lens, the chromatic aberration correction lens correcting a chromatic aberration occurring due to a change in a wavelength of the emitted light and/or due to an increase in a wavelength bandwidth of the emitted light, the chromatic aberration correction lens comprising a first lens having a positive power and a second lens having a negative power adjacent to each other, a total focal length of the chromatic aberration correction lens being infinite as compared to the objective lens; and

a photodetector to receive the light reflected from the recording medium and then incident thereon through the optical path changer.

2. The optical pickup device of claim 1, wherein the total focal length of the chromatic aberration correction lens is at least 10 m.

3. The optical pickup device of claim 1, wherein an Abbe number of an optical material, of which the first lens having the positive power is formed, at a d-line, is larger than that of an optical material, of which the second lens having the negative power is formed, at the d-line.

4. The optical pickup device of claim 1, wherein the second lens having the negative power and the first lens having the positive power are sequentially disposed from the light source, and the first and second lenses have similar powers.

5. The optical pickup device of claim 4, wherein the first and the second lenses are formed of glass materials, respectively, which have different Abbe numbers at a d-line

and similar refractivities.

6. The optical pickup device of claim 4, wherein surfaces of the second and first lenses facing the light source and the objective lens, respectively, have negative radii of curvature, and a surface between the first and second lenses has a positive radius of curvature, the negative radii of curvature having magnitudes greater than the positive radius of curvature.

7. The optical pickup device of claim 1, wherein the first lens having the positive power and the second lens having the negative power are sequentially disposed from the light source, surfaces of the first and second lenses facing the light source and the objective lens, respectively, have positive radii of curvature, a surface between the first and second lenses has a negative radius of curvature, and the radii of curvature of the surfaces facing the light source, the objective lens and between the first and second lenses have similar magnitudes.

8. The optical pickup device of claim 1, wherein the chromatic aberration correction lens further comprises a third lens having a negative power, and the second lens having the negative power, the first lens having the positive power, and the third lens having the negative power are sequentially disposed from the light source.

9. The optical pickup device of claim 8, wherein the first and third lenses are formed of glass materials, respectively, which have similar Abbe numbers at a d-line, and the second lens is formed of a glass material having an Abbe number different from those of the glass materials of the first and third lenses.

10. The optical pickup device of claim 8, wherein surfaces of the second and third lenses facing the light source and the objective lens, respectively, have positive radii of curvature, a surface between the first and second lenses has a positive radius of curvature, and a surface between the first and third lenses has a negative radius of curvature.

11. The optical pickup device of claim 1, further comprising a collimating lens between the light source and the chromatic aberration correction lens, the collimating lens changing the emitted light into a parallel light, so that the parallel light is incident on the

chromatic aberration correction lens.

12. The optical pickup device of claim 11, further comprising a beam shaping device on an optical path between the light source and the chromatic aberration correction lens, the beam shaping device shaping the emitted light from the light source.

13. The optical pickup device of claim 1, wherein the chromatic aberration correction lens satisfies $0.95 \leq h_o/h_i \leq 1.05$ when a height of the emitted light incident on the chromatic aberration correction lens is h_i, and a height of the emitted light exiting the chromatic aberration correction lens is h_o.

14. The optical pickup device of claim 2, wherein the chromatic aberration correction lens satisfies $0.95 \leq h_o/h_i \leq 1.05$ when a height of the emitted light incident on the chromatic aberration correction lens is h_i, and a height of the emitted light exiting the chromatic aberration correction lens is h_o.

15. The optical pickup device of claim 3, wherein the chromatic aberration correction lens satisfies $0.95 \leq h_o/ h_i \leq 1.05$ when a height of the emitted light incident on the chromatic aberration correction lens is h_i, and a height of the emitted light exiting the chromatic aberration correction lens is h_o.

16. The optical pickup device of claim 4, wherein the chromatic aberration correction lens satisfies $0.95 \leq h_o/ h_i \leq 1.05$ when a height of the emitted light incident on the chromatic aberration correction lens is h_i, and a height of the emitted light exiting the chromatic aberration correction lens is h_o.

17. The optical pickup device of claim 7, wherein the chromatic aberration correction lens satisfies $0.95 \leq h_o/ h_i \leq 1.05$ when a height of the emitted light incident on the chromatic aberration correction lens is h_i, and a height of light exiting the chromatic aberration correction lens is h_o.

18. The optical pickup device of claim 8, wherein the chromatic aberration correction lens satisfies $0.95 \leq h_o/h_i \leq 1.05$ when a height of the emitted light incident on the

chromatic aberration correction lens is h_i, and a height of the emitted light exiting the chromatic aberration correction lens is h_o.

19. The optical pickup device of claim 1, wherein the chromatic aberration correction lens satisfies $0< 1/(f1\cdot v1)+1/(f2\cdot v2)+ \ldots +1/(fn\cdot vn) <0.008$ when focal lengths of the lenses comprising the chromatic aberration correction lens and the objective lens with respect to the light source are f1, f2, ... and fn, and Abbe numbers of optical materials forming the lenses comprising the chromatic aberration correction lens and the objective lens at a d-line are v1, v2, ... and vn.

20. The optical pickup device of claim 2, wherein the chromatic aberration correction lens satisfies $0< 1/(f1\cdot v1)+1/(f2\cdot v2)+ \ldots +1/(fn\cdot vn) <0.008$ when focal lengths of the lenses comprising the chromatic aberration correction lens and the objective lens with respect to the light source are f1, f2, ... and fn, and Abbe numbers of optical materials forming the lenses comprising the chromatic aberration correction lens and the objective lens at a d-line are v1, v2, ... and vn.

21. The optical pickup device of claim 3, wherein the chromatic aberration correction lens satisfies $0< 1/(f1\cdot v1)+1/(f2\cdot v2)+ \ldots +1/(fn\cdot vn) <0.008$ when focal lengths of the lenses comprising the chromatic aberration correction lens and the objective lens with respect to the light source are f1, f2, ... and fn, respectively, and the Abbe numbers of the optical materials forming the lenses comprising the chromatic aberration correction lens and an Abbe number of an optical material forming the objective lens at the d-line are v1, v2, ... and vn.

22. The optical pickup device of claim 4, wherein the chromatic aberration correction lens satisfies $0< 1/(f1\cdot v1)+1/(f2\cdot v2)+ \ldots +1/(fn\cdot vn) <0.008$ when focal lengths of the lenses comprising the chromatic aberration correction lens and the objective lens with respect to the light source are f1, f2, ... and fn, and Abbe numbers of optical materials forming the lenses comprising the chromatic aberration correction lens and the objective lens at a d-line are v1, v2, ... and vn.

23. The optical pickup device of claim 7, wherein the chromatic aberration correction lens satisfies $0< 1/(f1\cdot v1)+1/(f2\cdot v2)+ \ldots +1/(fn\cdot vn) <0.008$ when focal lengths of

the lenses comprising the chromatic aberration correction lens and the objective lens with respect to the light source are f1, f2, ... and fn, and Abbe numbers of optical materials forming the lenses comprising the chromatic aberration correction lens and the objective lens at a d-line are v1, v2, ... and vn.

24. The optical pickup device of claim 8, wherein the chromatic aberration correction lens satisfies $0< 1/(f1 \cdot v1)+1/(f2 \cdot v2)+ \ldots +1/(fn \cdot vn) <0.008$ when focal lengths of the lenses comprising the chromatic aberration correction lens and the objective lens with respect to the light source are f1, f2, ... and fn, and Abbe numbers of optical materials forming the lenses comprising the chromatic aberration correction lens and the objective lens at a d-line are v1, v2, ... and vn.

25. The optical pickup device of claim 1, wherein the objective lens has a numerical aperture of between 0.65 and 0.85.

26. The optical pickup device of claim 1, wherein the light source is a semiconductor laser and the emitted light has a wavelength of 420 nm or less.

27. An optical pickup device comprising:

a light source to emit light;

an objective lens to focus the light emitted from the light source on a recording medium; and

a chromatic aberration correction unit disposed on an optical path of the emitted light between the light source and the objective lens, the chromatic aberration correction unit correcting a chromatic aberration occurring due to a change in a wavelength of the emitted light and/or due to an increase in a wavelength bandwidth of the emitted light, the chromatic aberration correction unit comprising a first lens having a positive power and a second lens having a negative power adjacent to each other.

28. The optical pickup device of claim 27, wherein a total focal length of the chromatic aberration correction unit is at least 10 m.

29. The optical pickup device of claim 28, wherein the total focal length of the chromatic aberration correction lens is infinite as compared to the objective lens.

30. The optical pickup device of claim 29, wherein the change in the wavelength results from a change in a light output power of the light source.

31. The optical pickup device of claim 29, wherein the change in the wavelength results from driving the light source with a high frequency (HF).

32. The optical pickup device of claim 27, wherein the light source is a surface emitting laser emitting a substantially circular beam.

33. The optical pickup device of claim 27, further comprising:

a collimator disposed on the optical path between the light source and the chromatic aberration correction unit to condense the light emitted from the light source to be parallel;

an optical path changer disposed on the optical path between the light source and the objective lens, the optical path changer changing a path of the emitted light; and

a photodetector to receive light reflected from the recording medium and then incident thereon through the optical path changer.

34. The optical pickup device of claim 33, further comprising a sensing lens disposed on an optical path of the emitted light between the beam splitter and the photodetector to include an astigmatism into the light incident on the recording medium.

35. The optical pickup device of claim 27, wherein the chromatic aberration correction unit satisfies $0.95 \leq h_o/h_i \leq 1.05$ when a height of the emitted light incident on the chromatic aberration correction unit is h_i, and a height of the emitted light exiting the chromatic aberration correction lens is h_o.

36. The optical pickup device of claim 27, wherein the chromatic aberration correction unit satisfies $0 < 1/(f1 \cdot v1) + 1/(f2 \cdot v2) + \ldots + 1/(fn \cdot vn) < 0.008$ when focal lengths of the lenses comprising the chromatic aberration correction unit and the objective lens with respect to the light source are f1, f2, ... and fn, respectively, and Abbe numbers of optical materials forming the lenses comprising the chromatic aberration correction unit and the objective lens at a d-line are v1, v2, ... and vn.

37. The optical pickup device of claim 27, wherein the objective lens has a numerical aperture of between 0.65 and 0.85.

38. The optical pickup device of claim 27, wherein the wavelength of the light source is 420 nm or less.

39. The optical pickup device of claim 38, wherein the light source is a semiconductor laser.

40. A lens system receiving an incident light, comprising:

a first lens having a first power and a second lens, adjacent to the first lens, having a second power opposite to the first power, wherein the first and second lenses correct a chromatic aberration occurring due to a change in a wavelength of the incident light and/or due to an increase in a wavelength bandwidth of the incident.

41. The lens system of claim 40, wherein the first power is positive and the second power is negative.

42. The lens system of claim 27, wherein the chromatic aberration correction unit has an optical power of nearly zero.